

# SUBSTITUTE SPECIFICATION

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*Approved  
8/3/06  
T. Cam*

## DIAGNOSTIC METHOD AND APPARATUS FOR NON-DESTRUCTIVELY OBSERVING LATCH DATA

### Background of Invention

[0001] Field of the Invention

[0002] The present invention generally relates to latch circuits and more particularly to a circuit that examines the data within the latch circuit without altering or destroying the data.

[0003] Description of the Related Art

[0004] When bringing up and debugging logic state machines, it is of interest to be able to observe the state of latches for parts or all of the logic on the device without destroying the state of those latches. This is important both for initialization and for debug of follow-on manufacturing processes. It is also an advantage for the method of observation not to require prior knowledge of the latch constitution.

10/604,550

**IN THE SPECIFICATION:**

Please amend the specification as follows:

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[0016] As shown in Figure 1, the invention provides a circuit that can observe data within shift registers without altering the data. The circuit includes selectors (e.g., demultiplexors/multiplexors) 106, 107 connected to the inputs 121 and outputs 122 of the shift registers 112-114. The selectors 106, 107 selectively connect the input with the output 122 of one of the shift registers 112-114 to form a wiring loop 105 for the selected shift register.

[0028] The control logic 100, either as part of a normal operation, or as a specific operation code can be programmed to select one of the shift registers 112-114, and cause that shift register to shift in a rotating circular fashion via the two demultiplexors/multiplexors 106, 107. This allows the data in that shift register to be observed out of the observation input/output 103. Upon completion of the rotating shift operation, the initial value of the shift register is restored. Because this is a shift in a circular fashion, the control logic 100 only needs to shift the number of elements in the shift register in order to restore the data back to its original position.